REMARKS/ARGUMENTS

Examiner Pham is thanked for the thorough examination of the subject Patent Application. The Claims have been carefully reviewed and amended, and are considered to be in condition for allowance.

Reconsideration of the rejection under 35 USC §103(a) of Claims 1-4, 6, 8-9,19-23, 25 and 27 as being unpatentable over in by U.S. Patent Publication Number 2003/0064684 (Zinn) in view of U. S. Patent 7,010,271 (Melanson) and further in view of U. S. Patent 6,038,255 (Palmer et al.) is requested in light of the following arguments. Zinn does describe an encoder that provides a rudimentary pulse width modulation. An input signal is compared with a sense voltage that is determined in a voltage divider having a variable impedance. The trigger point is based on level of the sense voltage. Melanson does provide an audio input signal and a low frequency clock (square wave) generated by a divider circuit. Palmer et al. does describe a transceiver with a mixer and a demodulator circuit. Neither Zinn, nor Melanson, nor Palmer et al., nor the combination of Zinn, Melanson, and Palmer et al. teach to:

> a pulse width amplifier to receive an audio signal and a reference control ramp signal to compare said a voltage level of said audio signal with said <u>reference control ramp signal</u> to generate a digital output signal such that a pulse width of said digital output signal is modulated by said audio signal, such that the pulse

width is proportional to an amplitude of said voltage level of said audio signal to provide a pulse width modulated signal; (Claim 1, Lines 3-9)

an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore the audio signal (Claim 1, Lines 21-24);

acquiring the audio signal;

comparing said audio signal with a reference control ramp signal;

from said comparing, generating a digital output signal such that a pulse width of said digital output signal is modulated by said audio signal, such that the pulse width is proportional to an amplitude of said voltage level of said audio signal to provide a pulse width modulated signal; (Claim 20, Lines 3-9)

integrating the restored pulse width modulated signal to remove a timing signal from said restored pulse width modulated signal to extract said audio signal. (Claim 20, Lines 19-21)

As noted by the Examiner, Zinn does not teach to an input audio signal and a ramp control signal that are compared to generate a digital output signal such that a pulse width of the digital output signal is modulated by the audio

signal, such that the pulse width is proportional to an amplitude of the voltage level of the audio signal to provide a pulse width modulated signal. Melanson teaches a programmable frequency divider **209** of Fig. 2 that is used to generate low frequency clock (square wave) for driving digital PWM controller **204** of Fig. 2. The Divider **209** could for example start with a base frequency that is a multiple of the sampling frequency used in the A/D conversion process, and divide by a factor to obtain a frequency that is multiple of the sampling frequency. The resulting time slots make it possible to generate PWM pulse widths that are the fractions of the periods wide. Melanson does not teach to a reference control ramp signal **30** of Fig. 3 of this invention that is a triangular shaped signal, which is compared to the audio input signal to generate the digital output signal whose pulse width is modulated by the amplitude of the audio input signal, such that the pulse width is proportional to an amplitude of the voltage level of the audio signal to provide a pulse width modulated signal.

As noted by the Examiner, neither Zinn nor Melanson teach to a receiver with a down converter. The integrator **222** as discussed in paragraph [0030] of Zinn "receives the modulated signal **132**. The integrator generates an average DC voltage **224** proportional to the duty cycle of the modulated signal **132**, where the duty cycle is proportional to the select voltage." While a low pass filter is required to generate the DC voltage, there is no teaching to removing a timing signal from a pulse width modulated signal to restore an audio signal. As noted by the Examiner, Zinn does not teach to or imply a pulse width amplifier. Palmer

et al. does provide a receiver with a down converter, however neither Zinn, nor Melanson, nor Palmer et al. teach to an integrator that receives the restored pulse width modulated signal to remove a timing signal from the restored pulse width modulated signal to extract the audio signal.

The invention as claimed in amended Claims 1-4, 6, 8-9,19-23, 25 and 27 is believed to be novel and patentable over Zinn, Melanson, Palmer et al., or the combination of Zinn, Melanson, and Palmer et al. because there is not sufficient basis for concluding that the combination of claimed elements would have been obvious to one skilled in the art. That is to say, there must be something in the prior art or line of reasoning to suggest that the combination of these various references is desirable. The applicant believes that there is no such basis for the combination. The applicant therefore requests Examiner Pham reconsider the rejection in view of these arguments.

Reconsideration of the rejection under 35 USC §103(a) of Claims 10-12, and 14 as being unpatentable over in by U.S. Patent Publication Number 2003/0064684 (Zinn) in view of U. S. Patent 7,010,271 (Melanson) is requested in light of the following arguments. Zinn does describe an encoder that provides a rudimentary pulse width modulation. An input signal is compared with a sense voltage that is determined in a voltage divider having a variable impedance. The trigger point is based on level of the sense voltage. Melanson does provide an audio input signal and a low frequency clock (square wave) generated by a

divider circuit. Neither Zinn, nor Melanson, nor the combination of Zinn and Melanson, teach to:

> a pulse width amplifier to receive an audio signal and a reference control ramp signal to compare said a voltage level of said audio signal with said reference control ramp signal to generate a digital output signal such that a pulse width of said digital output signal is modulated by said audio signal, such that the pulse width is proportional to an amplitude of said voltage level of said audio signal to provide a pulse width modulated signal. (Claim 10, Lines 2-9)

As noted by the Examiner, Zinn does not teach to an input audio signal and a ramp control signal that are compared to generate a digital output signal such that a pulse width of the digital output signal is modulated by the audio signal, such that the pulse width is proportional to an amplitude of the voltage level of the audio signal to provide a pulse width modulated signal. Melanson teaches a programmable frequency divider **209** of Fig. 2 that is used to generate low frequency clock (square wave) for driving digital PWM controller **204** of Fig. 2. The Divider **209** could for example start with a base frequency that is a multiple of the sampling frequency used in the A/D conversion process, and divide by a factor to obtain a frequency that is multiple of the sampling frequency. The resulting time slots make it possible to generate PWM pulse widths that are the fractions of the periods wide. Melanson does not teach to a <u>reference control</u>

ramp signal **30** of Fig. 3 of this invention that is a triangular shaped signal, which is compared to the audio input signal to generate the digital output signal whose pulse width is modulated by the amplitude of the audio input signal, such that the pulse width is proportional to an amplitude of the voltage level of the audio signal to provide a pulse width modulated signal.

The invention as claimed in amended Claims 10-12, and 14 is believed to be novel and patentable over Zinn, Melanson, or the combination of Zinn and Melanson because there is not sufficient basis for concluding that the combination of claimed elements would have been obvious to one skilled in the art. That is to say, there must be something in the prior art or line of reasoning to suggest that the combination of these various references is desirable. The applicant believes that there is no such basis for the combination. The applicant therefore requests Examiner Pham reconsider the rejection in view of these arguments.

Reconsideration of the rejection under 35 USC §103(a) of Claims 15-16, as being unpatentable over in by U.S. Patent Publication Number 2003/0064684 (Zinn) in view of U. S. Patent 6,038,255 (Palmer et al.) is requested in light of the following arguments. Zinn does describe an encoder that provides a rudimentary pulse width modulation. An input signal is compared with a sense voltage that is determined in a voltage divider having a variable impedance. The trigger point is based on level of the sense voltage. Palmer et al. does describe a transceiver

with a mixer and a demodulator circuit. Neither Zinn, nor Palmer et al., nor the combination of Zinn and Palmer et al. teach to:

> an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore the audio signal (Claim 15, Lines 8-11);

As noted by the Examiner, Zinn does not teach to a receiver with a down converter. The integrator **222** as discussed in paragraph [0030] of Zinn "receives the modulated signal **132**. The integrator generates an average DC voltage **224** proportional to the duty cycle of the modulated signal **132**, where the duty cycle is proportional to the select voltage." While a low pass filter is required to generate the DC voltage, there is no teaching to removing a timing signal from a pulse width modulated signal to restore an audio signal. As noted by the Examiner, Zinn does not teach to or imply a pulse width amplifier. Palmer et al. does provide a receiver with a down converter, however neither Zinn nor Palmer et al. teach to an integrator that receives the restored pulse width modulated signal to remove a timing signal from the restored pulse width modulated signal to extract the audio signal.

The invention as claimed in amended Claims 15-16, 18 is believed to be novel and patentable over Zinn, Palmer et al., or the combination of Zinn and Palmer et al. because there is not sufficient basis for concluding that the

combination of claimed elements would have been obvious to one skilled in the art. That is to say, there must be something in the prior art or line of reasoning to suggest that the combination of these various references is desirable. The applicant believes that there is no such basis for the combination. The applicant therefore requests Examiner Pham reconsider the rejection in view of these arguments.

Reconsideration of the rejection under 35 USC §103(a) of Claims 5, 7, 13, 17, 24, and 26 as being unpatentable over in by U.S. Patent Publication Number 2003/0064684 (Zinn) in view of U. S. Patent 7,010,271 (Melanson) and U. S. Patent 6,038,255 (Palmer et al.), further in view of U. S. Patent 6,690,949 (Shamlou et al.) is requested in light of the following arguments. Zinn does describe an encoder that provides a rudimentary pulse width modulation. An input signal is compared with a sense voltage that is determined in a voltage divider having a variable impedance. The trigger point is based on level of the sense voltage. Melanson does provide an audio input signal and a low frequency clock (square wave) generated by a divider circuit. Palmer et al. does describe a transceiver with a mixer and a demodulator circuit. Shamlou et al. does discuss a demodulator that employs Quadrature Phase Shift Key, Differential Quadrature Phase Shift, Amplitude Shift Keying and Frequency Shift Keying demodulation schemes. Neither Zinn, nor Melanson, nor Palmer et al., nor Shamlour et al., nor the combination of Zinn, Melanson, Palmer et al. and Shamlou et al. teach to:

a pulse width amplifier to receive an audio signal and a reference control ramp signal to compare said a voltage level of said audio signal with said reference control ramp signal to generate a digital output signal such that a pulse width of said digital output signal is modulated by said audio signal, such that the pulse width is proportional to an amplitude of said voltage level of said audio signal to provide a pulse width modulated signal; (Claim 1, Lines 3-9)

an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore the audio signal (Claim 1, Lines 21-24);

a pulse width amplifier to receive an audio signal and a reference control ramp signal to compare said a voltage level of said audio signal with said reference control ramp signal to generate a digital output signal such that a pulse width of said digital output signal is modulated by said audio signal, such that the pulse width is proportional to an amplitude of said voltage level of said audio signal to provide a pulse width modulated signal; (Claim 10, Lines 2-8)

an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore an audio signal. an integrator in communication with the down-converter to receive the extracted pulse width modulated signal to remove a timing signal from said extracted pulse width modulated signal to restore an audio signal; (Claim 15, Lines 8-11)

acquiring the audio signal;

comparing said audio signal with a reference control ramp signal;

from said comparing, generating a digital output signal such that a pulse width of said digital output signal is modulated by said audio signal, such that the pulse width is proportional to an amplitude of said voltage level of said audio signal to provide a pulse width modulated signal; (Claim 20, Lines 3-9)

integrating the restored pulse width modulated signal to remove a timing signal from said restored pulse width modulated signal to extract said audio signal. (Claim 20, Lines 19-21)

As noted by the Examiner, Zinn does not teach to nor does Shamlou et al. teach to an input audio signal and a ramp control signal that are compared to

generate a digital output signal such that a pulse width of the digital output signal is modulated by the audio signal, such that the pulse width is proportional to an amplitude of the voltage level of the audio signal to provide a pulse width modulated signal. Melanson teaches a programmable frequency divider **209** of Fig. 2 that is used to generate low frequency clock (square wave) for driving digital PWM controller **204** of Fig. 2. The Divider **209** could for example start with a base frequency that is a multiple of the sampling frequency used in the A/D conversion process, and divide by a factor to obtain a frequency that is multiple of the sampling frequency. The resulting time slots make it possible to generate PWM pulse widths that are the fractions of the periods wide. Melanson does not teach to a reference control ramp signal **30** of Fig. 3 of this invention that is a triangular shaped signal, which is compared to the audio input signal to generate the digital output signal whose pulse width is modulated by the amplitude of the audio input signal, such that the pulse width is proportional to an amplitude of the voltage level of the audio signal to provide a pulse width modulated signal.

As noted by the Examiner, neither Zinn nor Melanson and further neither does Shamlou et al. teach to a receiver with a down converter. The integrator **222** as discussed in paragraph [0030] of Zinn "receives the modulated signal **132**. The integrator generates an average DC voltage **224** proportional to the duty cycle of the modulated signal **132**, where the duty cycle is proportional to the select voltage." While a low pass filter is required to generate the DC voltage, there is no teaching to removing a timing signal from a pulse width

modulated signal to restore an audio signal. As noted by the Examiner, Zinn does not teach to or imply a pulse width amplifier. Palmer et al. does provide a receiver with a down converter, however neither Zinn, nor Melanson, nor Palmer et al. nor Shamlou et al. teach to or sugget an integrator that receives the restored pulse width modulated signal to remove a timing signal from the restored pulse width modulated signal to extract the audio signal.

The invention as claimed in amended Claims 5, 7, 13, 17, 24, and 26 is believed to be novel and patentable over Zinn, Melanson, Palmer et al., Shamlou et al. or the combination of Zinn, Melanson, Palmer et al., and Shamlou et al. because there is not sufficient basis for concluding that the combination of claimed elements would have been obvious to one skilled in the art. That is to say, there must be something in the prior art or line of reasoning to suggest that the combination of these various references is desirable. The applicant believes that there is no such basis for the combination. The applicant therefore requests Examiner Pham reconsider the rejection in view of these arguments.

Applicant respectfully requests that a timely Notice of Allowance for all claims be issued in this case.

It is requested that should the Examiner not find that the Claims are now allowable, that the undersigned be called at (845) 452-5863 to overcome any problems preventing allowance.

Respectfully Submitted,
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5